

REMARKS

Claims 1-59 are pending in the present application.

Claims 20-21, 32, and 34-38 were rejected in the present Office Action.

Claims 39-47 and 50-53 were objected to in the present Office Action.

Claims 1-19, 22-31, 33, 48, 49, and 54-59 stand withdrawn.

In order to emphasize the patentable distinctions of applicants' contribution to the art, claim 38 has been amended to call for a method wherein the step of containing the toroid comprises placing a base on at least a portion of the bottom of the toroid and placing at least one of an inner ring circumferentially about at least a portion of the toroid inner side surface, an outer ring circumferentially about at least a portion of the toroid outer side surface, and a hat on at least a portion of the toroid top.

In order to provide adequate coverage for applicants' contribution to the art, new claims 60-65 dependent on claim 32 are presented herewith. Claims 60 and 61 are directed to preferred methods of applying adhesive to the toroid generally employing atmospheric soak and vacuum techniques, respectively. Claims 62-65 recite preferred forms of the curing process, wherein the curing process is carried out at a heat treating temperature and the thermal processing of the electromechanical component shape is carried out at a thermal processing temperature, the heat treating temperature being a fraction of the heat processing temperature. New claims 60-65 are submitted to be patentable for at least the same reasons as set forth below for claim 32, on which they all depend.

Support for the amendment of claim 38 and new claims 60-65 is provided by the original specification; particularly at page 5, lines 1-2, 6-11, and 19-21; page 6; and page 7, lines 1-2; and claims 22-23 and 25-28 as originally filed. Consequently, no new matter has been added.

Claims 20-31 haven been cancelled without prejudice to expedite prosecution.

Applicants' invention, as recited by remaining claims 20-21, 32, 34-47, and 50-53, together with new claims 60-65, provides a method for manufacturing a soft magnetic metal electromechanical component. Generally stated, the method comprises the steps of winding soft magnetic metal into a toroid; containing the toroid within a milling assembly; applying an adhesive to the toroid; curing the adhesive; milling the toroid into an electro-mechanical component shape; and thermally processing the electro-mechanical component shape into an electro-mechanical component. The containment afforded by the milling assembly permits reliable and efficient manufacture of the present component. Fracture and delamination of the ribbon-form material are mitigated or eliminated, preventing mechanical and magnetic degradation of the present component. These difficulties are especially likely to occur in manufacturing components employing hard and brittle materials, such as amorphous metal ribbon.

The Examiner has objected to the title of the invention as filed as not being descriptive. Appreciation is expressed for his constructive suggestion of a new title. For the sake of clarity, the Examiner's suggested title has been adopted as set forth above.

The Examiner has also cited the phrase "U.S. Patent" in line 3 of page 1 as being incomplete. For the sake of clarity, the initial paragraph of the application has been rewritten and given a section heading of "Related U.S. Application Data." The amendment clarifies the cross-reference as being

directed to co-pending U.S. Patent Application Serial No. 10/458,944. Inasmuch as the '944 application has now matured into an issued U.S. Patent, the corresponding patent number is also added.

It is respectfully submitted that the Examiner's objections to the specification have been cured by way of the foregoing amendment of the title and cross-reference to the parent U.S. patent application. Reconsideration of the objections to the specification is requested.

Claim 20 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 20 of co-pending U.S. Patent Applications Serial No. 10/876,034. Inasmuch as claim 20 of the instant application has been cancelled herewith, it is submitted that this rejection is now moot.

Accordingly, reconsideration of the provisional rejection of claim 20 under the doctrine of nonstatutory obviousness-type double patenting as being unpatentable over claim 20 of co-pending U.S. Patent Applications Serial No. 10/876,034 is respectfully requested.

Claim 20 was rejected under 35 USC 102(b) as being anticipated by British patent publication GB 597,218. Inasmuch as claim 20 has been cancelled herewith, it is submitted that this rejection is now moot.

Accordingly, reconsideration of the rejection of claim 20 under 35 USC 102(b) as being anticipated by British patent publication GB 597,218 is respectfully requested.

Claims 20, 21, 32, and 34 were rejected under 35 USC 102(e) as being anticipated by US Patent No. 6,803,694 to Decristofaro et al., which is directed to a unitary amorphous metal magnetic

component for an axial flux electric machine such as a motor or generator. This rejection will be discussed with regard to claims 32 and 34, since claims 20 and 21 have now been cancelled.

The Examiner alleges that Decristofaro discloses a method comprising winding a soft magnetic material ribbon into a toroid; containing the toroid with a toroidal geometry; milling the toroid into an electro-mechanical component shape; and thermally processing the component shape into an electro-mechanical component by heating.

Applicants respectfully submit that such a disclosure, even if made, *arguendo*, by Decristofaro, falls short of disclosing or suggesting every feature of claim 32 and claim 34 dependent thereon. In particular, claim 32 calls for a step of “containing the toroid within a milling assembly.” The present rejection does not identify any structure disclosed or suggested by Decristofaro that could be construed as being the “milling assembly” employed in carrying out the required “containing” step. To the contrary, the Decristofaro disclosure cited by the Examiner (col. 12, lines 54-60) merely calls for the use of adhesive bonding to secure the layers of the wound toroid to adjacent layers. Applicants have found that carrying out the present method without the use of a milling assembly, and solely with adhesive bonding of the layers as provided by Decristofaro et al., is highly problematical, because delamination and fracture of the workpiece structure frequently occur during a milling or like cutting operation. The resulting mechanical degradation in turn is unacceptable for many end uses, notably including use in dynamoelectric machines. The disruption adversely affects both mechanical and magnetic properties of the device, leading to reduced energy efficiency of the device and the likelihood of mechanical failure of the component during its appointed service.

In view of Decristofaro et al.’s failure to disclose or suggest every feature delineated by claims 32 and 34, it is submitted that a novelty rejection is untenable.

Accordingly, reconsideration of the rejection of claims 20, 21, 32, and 34 under 35 USC 102(e) as being anticipated by Decristofaro et al. is respectfully requested.

Claims 35-38 were rejected under 35 USC 103(a) as being unpatentable over Decristofaro et al. in view of US Patent No. RE 28,559 to Villano, which is directed to an apparatus for milling Swiss-type screw machine cams.

The Examiner has acknowledged that Decristofaro et al. fails to mention that the milling assembly includes either one of: an inner ring, an outer ring, a hat, or a base, as alternatively recited by claims 35-38, and therefore has pointed to Villano as allegedly teaching a process that includes a milling assembly that includes a work support. He specifically points to features denoted by reference numerals 40, 133, and 128, which are depicted by Villano's Fig. 4. The Examiner asserts that the Villano work support can broadly be read alternatively as either one of "an inner ring," "an outer ring," "a hat," or "a base," to mill radial slots within a toroid (e.g. a circular member).

Applicants respectfully traverse the Examiner's reading of both Decristofaro and Villano. As set forth above in connection with the novelty rejection of claims 20, 21, 32, and 34, applicants maintain that Decristofaro fails to disclose or suggest any containment milling assembly whatsoever. Decristofaro is also devoid of any evidence that such a milling assembly would be beneficial, let alone needed. It is further submitted that Villano does not add to Decristofaro in this respect.

The Examiner has pointed to three structures as exemplary of the Villano work support. These features are identified and discussed in col. 7 of Villano: item 40 is termed a "work support" (lines 33-34); item 128 is a "rotary table" (line 43); and item 133 is a "cam blank" (line 42). It is respectfully submitted that item 133 is itself the workpiece being machined, so that identification thereof as a "work support" is clearly improper. Applicants further maintain that work support 40 and rotary table

128 are items routinely associated with vertical milling machines, as would be recognized by a person having ordinary skill in the machine tool art. Although Decristofaro does not discuss the machining of his component in extensive detail, it is said that any known technique may be used, including high-speed milling performed in either horizontal or vertical orientations (col. 14, lines 16-17 and 19-20). It is respectfully submitted that Fig. 4 of Villano generally depicts one form of vertical machining. Applicants maintain that one of ordinary skill in the machine tool art would recognize that a rotary table and a planar support, such as features 128 and 40, respectively, of Fig. 4, are routinely used in machining operations carried out using a vertical-axis milling machine, so Villano, at best, does not provide any disclosure regarding the support of workpieces that is not already implicit in the Decristofaro disclosure. Moreover, such a skilled artisan would not recognize features 128 or 40, either singly or in combination, as providing a milling assembly within which is contained a workpiece. At best, the Villano workpiece (cam blank 133) rests on, and is secured to, support 40 and table 128.

Applicants further traverse the Examiner's assertion that the Villano work support can broadly be read alternatively as either one of "an inner ring," "an outer ring," "a hat," or "a base." It is submitted that the meaning given to "work support" in the Villano specification must be regarded from the point of view of a person of ordinary skill in light of that specification. The Examiner has not pointed to anything in Villano that would contravene an understanding of his work support as an ordinary planar support that would commonly be used in the machine tool industry. Simply put, the workpiece (cam blank 133) rests on work support 40, which in turn rests on rotary table 128. The items are secured to each other in accordance with ordinary machine-shop practice. Nothing in the present Office Action provides any evidence that a skilled artisan, even in possession of Decristofaro and Villano, would reach structures that could be construed as an inner ring, an outer ring, or a hat, as

those terms are used in the present specification. These terms must be construed in specific relationship to the geometric structure of the toroid recited in claim 34, which includes inner and outer surfaces, a top, and a bottom. The solid structure of the cam blank of Villano particularly precludes any reading involving an "inner ring," since there is no identifiable inner surface in that blank. Any contention that Villano can be read as providing any of an inner ring, an outer ring, or a hat is thus submitted to be hindsight. It is thus maintained that claims 35-37 are not obvious over Decristofaro and Villano.

Claim 38 has been amended to call for both a base and at least one of an inner ring, an outer ring, and a hat. Even if the support 40 were *arguendo* regarded as a base, it is submitted that the additional feature of an inner ring, an outer ring, or a hat clearly is not disclosed or suggested.

Applicants further traverse the propriety of any combination of Villano with Decristofaro. Villano does not disclose or suggest any machining operation pertaining to a workpiece that is other than a solid item, e.g. blank 133 appointed for use as a cam in a machining operation. Nothing in Villano suggests any process for machining a workpiece formed of a structure formed by winding ribbon, e.g. into a toroid. The very nature of a solid workpiece provides it with a substantial level of structural integrity, distinguishing it from the ribbon-wound workpiece being processed in both Decristofaro and the present method. After having its peripheral shape established by machining, the Villano cam inherently relies on structural strength for its ultimate functionality, which involves direct contact with other mechanical parts during the cam's end use. The solid blank thus has no particular propensity for the kinds of degradation that attend machining of a wound toroidal structure, whether or not adhesively bonded. On the other hand, the structural requirements for the present electromagnetic component are far different, since the component does not directly and movably engage other

mechanical parts during its ordinary use. It is respectfully submitted that there would be no motivation for the skilled artisan to regard a solid workpiece as needing any form of containment. Applicants therefore maintain that no motivation undergirds the Examiner's proposed "broad reading" of the Villano work support. Even less would a skilled artisan be motivated to look to a combination of Villano with Decristofaro, since the workpieces being processed are of fundamentally different natures. Villano also does not relate in any way to a soft magnetic component. These factors, whether taken alone or in any combination, are submitted to demonstrate that the proposed combination is, in fact, a hindsight reconstruction.

In view of the amendment to claim 38 and the remarks set forth above, it is submitted that the method of claims 35-38 is not obvious over Decristofaro et al. and Villano, whether taken singly or in combination.

Accordingly, reconsideration of the rejection of claims 35-38 under 35 USC 103(a) as being unpatentable over Decristofaro et al. in view of Villano is respectfully requested.

The Examiner has indicated that claims 39-47 and 50-53 recite allowable subject matter. Each of these claims depends directly or indirectly from claim 32, which is submitted to be patentable for at least the reasons set forth hereinabove. Accordingly, it is submitted that claims 39-47 and 50-53 are also allowable. Reconsideration of the objection thereto is respectfully requested.

Applicants respectfully submit that the withdrawal of claims 55-59 in the present application is improper. In the Office Action dated August 1, 2006, the Examiner required restriction to one of three inventions designated as Groups I through III. Applicants' response entered August 28, 2006 elected the claims of Group III (claims 20-30, 32-53, and 55-59). The same restriction requirement further

required that if Group III were elected, a further election of a subgroup within Group III was required. Accordingly, applicants elected Group III-D, which the Examiner identified as comprising claims 35-53 and 55-59, for further prosecution on the merits. The Examiner has thus not articulated any proper basis for the withdrawal of claims 55-59. Accordingly, it is submitted that the withdrawal of claims 55-59 from prosecution was improper. Claims 55-59 are submitted to be patentable over the art of record for at least the same reasons as set forth hereinabove.

Reconsideration of the withdrawal of claims 55-59 and their allowance are respectfully requested.

In the Office Action dated August 1, 2006, the Examiner acknowledged that the inventions designated as belonging to Groups III-A through III-E are linked by generic claims 20, 21, 32, and 34. It is respectfully submitted that claims 32 and 34 are allowable over the art of record for the reasons set forth above. Applicants thus respectfully request rejoinder of claim 33 of Group III-C, claims 48-49 of Groups III-D and III-E, and claims 55-59 of Group III-D. Each of these claims presently stands withdrawn as being directed to a non-elected invention. However, it is submitted that upon allowance of generic claims 32 and 34, applicants are entitled to such rejoinder and examination under 37 CFR 1.104. It is respectfully noted that claims 33 and 48-49 all depend from claim 32. Applicants accordingly request rejoinder of claims 33, 48-49, and 55-59 and maintain that each of said claims, as amended, is allowable over the art of record for at least the same reasons as set forth hereinabove in connection with the rejections over Decristofaro and over Decristofaro in view of Villano.

In view of the amendment of claim 38, the cancellation of claims 20-31, the amendment of the specification, and the foregoing remarks, it is submitted that the present application has been placed in

allowable condition. Reconsideration of the objections to the specification, the objection to claims 39-47 and 50-53, and the rejection of claims 20, 21, 32, and 34-38; rejoinder of claims 33, 48-49, and 55-59; and allowance of amended claims 20-21, 32-53, and 55-59, together with newly presented claims 60-65, are earnestly solicited.

Respectfully submitted,
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